

Appl. No. 09/729,128
Reply to Office Action of April 11, 2003

PATENT

AMENDMENTS

In the Claims:

- B1
1. (Currently Amended) A module for dispensing material to a semiconductor processing tool, the module comprising:
a vessel ~~including~~ defining a first integral chamber and a second integral chamber separated by a common wall, the vessel configured to receive the material from a bulk supply and to receive a pressurized flow of gas from a gas source; and
a valve assembly external from the vessel and operable to selectively permit fluid communication between the first chamber and the second chamber during a non-refill module state and to prevent fluid communication between the first chamber and the second chamber during a refill module state.
 2. (Original) The module of claim 1 wherein the second chamber is in fluid communication with the semiconductor fabrication tool and in fluid communication with a pressurized gas supply.
 3. (Original) The module of claim 2 further comprising a pressure release valve in communication with the second chamber, the pressure release valve configured to automatically vent the second chamber when a pressure within the second chamber exceeds a cracking pressure.
 4. (Original) The module of claim 2 further comprising:
a processor;
a pressure release valve in communication with the second chamber; and
a pressure sensor positioned in the second chamber and in communication with the processor to activate the pressure release valve to vent the second chamber when a pressure within the second chamber exceeds a threshold value.
 5. (Original) The module of claim 2 wherein:
the first chamber includes a first port and a second port;

Appl. No. 09/729,128
Reply to Office Action of April 11, 2003

PATENT

the second chamber includes a first port and a second port, the first port in fluid communication with the semiconductor fabrication tool and the second port in fluid communication with the pressurized gas supply; and

the valve assembly includes,

a first control valve positioned between the first port of the first chamber and the first port of the second chamber,

a second control valve positioned between the second port of the first chamber and the second port of the second chamber,

a material supply valve positioned between the first port of the first chamber and a bulk material supply,

a vent valve positioned between the second port of the first chamber and an outside environment;

such that in the non-refill module state the first and second control valves are open, the material supply valve is closed, and the vent valve is closed, and in the refill module state the first and second control valves are closed, the material supply valve is open, and the vent valve is open.

6. (Original) The module of claim 5 further comprising:

a dispense valve positioned between the second port of the second chamber and the semiconductor processing tool; and

a first fluid level sensor positioned in the second chamber and in electrical communication with the dispense valve, such that triggering of the first fluid level sensor automatically closes the dispense valve.

7. (Original) The module of claim 6 further comprising:

a processor; and

a second fluid level sensor positioned in the second chamber at a level above the first fluid level sensor, the second fluid level sensor in communication with the processor such that triggering the second fluid level sensor automatically initiates a change from the non-refill module state to the refill module state.

Appl. No. 09/729,128
Reply to Office Action of April 11, 2003

PATENT

8. (Original) The module of claim 6 further comprising a first fluid level sensor positioned in the first chamber and in electrical communication with the material supply valve, such that triggering of the first fluid level sensor automatically closes the material supply valve.

9. (Original) The module of claim 8 further comprising:
a processor; and
a second fluid level sensor positioned in the first chamber at a level below the first fluid level sensor, the second fluid level sensor in communication with a processor such that triggering of the second fluid level sensor initiates a change from the refill module state to the non-refill module state.

B1
Cont

10. (Original) The module of claim 2 wherein:
the first chamber includes a first port, a second port, and a third port;
the second chamber includes a first port, a second port, and a third port, the first port in fluid communication with the semiconductor fabrication tool and the second port in fluid communication with the pressurized gas supply; and
the valve assembly includes,
a first control valve positioned between the first port of the first chamber and the first port of the second chamber,
a second control valve positioned between the third port of the first chamber and the third port of the second chamber,
a material supply valve positioned between the second port of the first chamber and a bulk material supply,
a vent valve positioned between the first port of the first chamber and an outside environment;
such that in the non-refill module state the first and second control valves are open, the material supply valve is closed, and the vent valve is closed, and in the refill module state the first and second control valves are closed, the material supply valve is open, and the vent valve is open

Appl. No. 09/729,128
Reply to Office Action of April 11, 2003

PATENT

11. (Original) The module of claim 10 further comprising:
a dispense valve positioned between the second port of the second chamber and
the semiconductor processing tool; and

a first fluid level sensor positioned in the second chamber and in electrical
communication with the dispense valve, such that triggering of the first fluid level sensor
automatically closes the dispense valve.

12. (Original) The module of claim 11 further comprising:
a processor; and

a second fluid level sensor positioned in the second chamber at a level
above the first fluid level sensor, the second fluid level sensor in communication with the
processor such that triggering of the second fluid level sensor automatically initiates a change
from the non-refill module state to the refill module state.

13. (Original) The module of claim 11 further comprising a first fluid level
sensor positioned in the first chamber and in electrical communication with the material supply
valve, such that triggering of the first fluid level sensor automatically closes the material supply
valve.

14. (Original) The module of claim 13 further comprising:
a processor; and

a second fluid level sensor positioned in the first chamber at a level below
the first fluid level sensor, the second fluid level sensor in communication with a processor such
that triggering of the second fluid level sensor initiates a change from the refill module state to
the non-refill module state.

15. (Withdrawn) A method of continuously dispensing a material to a
semiconductor processing tool, the method comprising:

Appl. No. 09/729,128
Reply to Office Action of April 11, 2003

PATENT

supplying a pressurized flow of an inert gas to a first chamber of a vessel containing the material, such that the material in the first chamber flows out of the first chamber to the semiconductor processing tool;

in a refill state, while dispensing the material to the semiconductor processing tool from the first chamber, venting a second chamber of the vessel and supplying the material to the second chamber from a bulk material supply; and

in a non-refill state, sealing the second chamber from the environment and placing the second chamber in fluid communication with the first chamber, such that the material flows from the first chamber to the semiconductor processing tool.

16. (Withdrawn) The method of claim 15 wherein in the non-refill state the material is flowed in a path from the second chamber to the first chamber to the semiconductor processing tool.

17. (Withdrawn) The method of claim 15 wherein in the non-refill state the material is flowed in a path of at least one of from the second chamber to the semiconductor processing tool and from the second chamber to the first chamber to the semiconductor processing tool.

18. (Withdrawn) The method of claim 15 wherein in a change between the non-refill state and the refill state is triggered by a drop in a fluid level in the second chamber.

19. (Withdrawn) The method of claim 15 wherein a change between the non-refill state and the refill state is triggered by completion of processing of a predetermined number of wafers by the semiconductor processing tool.

20. (Currently Amended) A module for dispensing material to a semiconductor processing tool, the module comprising:

a vessel ~~including~~ defining a an integral first chamber and a an integral second chamber separated by a common wall;

Appl. No. 09/729,128
Reply to Office Action of April 11, 2003

PATENT

the first chamber including a first port and a second port, the first port configured to receive the material from a bulk supply through a material supply valve, and the second port in communication with an external environment through a vent valve,

the second chamber including a fluid level sensor, a first port, and a second port, the first port of the second chamber in fluid communication with a semiconductor processing tool through a dispense valve, the second port of the second chamber configured to receive a pressurized flow of gas from a pressurized gas supply through a gas inlet valve;

a an external pressure release valve in communication with the second port of the second chamber, the pressure release valve also in communication with the external environment;

a an external first control valve positioned between the first port of the first chamber and the first port of the second chamber; and

a an external second control valve positioned between the second port of the first chamber and the second port of the second chamber,

such that in the non-refill module state the first and second control valves are open, the material supply valve is closed, and the vent valve is closed, and in the refill module state the first and second control valves are closed, the material supply valve is open, and the vent valve is open, and transition between the non-refill module state and the module refill state is triggered by a drop in the material below the fluid level sensor.